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09/982,887	10/22/2001	Gunnar Flentje		7527

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EXAMINER	
JACOBSON, TONY M	

ART UNIT	PAPER NUMBER
2644	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/982,887	FLENTJE, GUNNAR	
	Examiner	Art Unit	
	Tony M. Jacobson	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/21/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 January 2005 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 21, 23, 24, 27, and 29** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. **Claims 21 and 27** recite, "the sum of the impedance of the fixed resistor and the impedance of the speaker is greater than impedance of coil". While Applicant discloses

(in the current application, but only partially in the priority document) a fixed resistor having a value of 22 Ω, a speaker having an inductance of 1 mH and a resistance of 8 Ω (thus implying a complex impedance of $8 + j\omega 0.001$ Ω, where ω represents an arbitrary radian frequency of an applied signal), and a variac (variable autotransformer) coil having an inductance of 53.5 mH and a resistance of 6 Ω (thus implying a complex impedance of $6 + j\omega 0.0535$ Ω) in general, and recites specific impedance magnitude values at specific frequencies, the examiner finds in the specification as filed no disclosure that in general the sum of the impedance of the fixed resistor and the impedance of the speaker should be greater than the impedance of the variac coil. Thus, the specification as filed does not provide written description for a limitation of such scope as required by the first paragraph of 35 USC § 112.

5. **Claims 23 and 29** recite, "wherein the inductance of the coil is about fifty times greater than inductance of the speaker". The specification as filed does not provide support for a limitation of such scope. While the specification discloses a variac (variable autotransformer) having an inductance of 53.5 mH and a speaker having and static inductance of approximately 1 mH, the examiner finds no disclosure of providing a variable autotransformer having an inductance that is in general about 50 times an arbitrary loudspeaker inductance (or the reverse). Thus, the specification as filed does not provide written description for a limitation of such scope as required by the first

paragraph of 35 USC § 112. Because **claim 24** inherits this limitation from claim 23, it is rejected on the same grounds.

6. **Claims 21 and 26** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

7. **Claims 21 and 27** recite, "the sum of the impedance of the fixed resistor and the impedance of the speaker is greater than impedance of coil". Since the impedance of the coil and loudspeaker vary with frequency, and the claim does not specify a particular frequency at which the impedances are determined, it would be reasonably assumed that the limitation should hold true for all frequencies, or at least the range of frequencies over which the apparatus is intended to operate. Applicant discloses at page 11 of the specification that "A typical guitar-signal ranges from **not less than 300Hz** up to 15kHz" (emphasis added); however, the examiner calculates that for the resistance and inductance values recited in the specification and repeated above, this limitation would only hold true for signal frequencies below about 87.5 Hz. At a frequency of 300 Hz, the examiner calculates that the series combination of the 22 Ω resistor and a loudspeaker with a resistance of 8 Ω and an inductance of 1 mH would exhibit an impedance of about 30.06 Ω magnitude, while the magnitude of the coil

impedance would be about 101 Ω, which is not consistent with the claim limitation. For frequencies above 300 Hz, the magnitude of the coil impedance becomes increasingly larger than the magnitude of the series combination of the fixed resistor and the speaker. Thus, the invention is not described in such a manner as to enable one of ordinary skill in the art to make and use the invention as claimed.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. **Claims 21-24** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. **Claim 21** recites the limitation "the speaker" in line 3 of the claim. There is insufficient antecedent basis for this limitation in the claim. Although the preamble of claim 20 recites an intended purpose "for use with a musical amplifier and a speaker", no prior mention of a speaker as part of the invention is made.

11. **Claim 21** recites, "The power attenuation circuit of claim 20, wherein the fixed resistor has an impedance; the speaker has an impedance; the coil has an impedance; and the sum of the impedance of the fixed resistor and the impedance of the speaker is greater than impedance of coil." A wide variety of different speaker types were known at the time the present invention was made, and a variety of different impedances were

known to be employed among each of these types; also, the impedance of a loudspeaker is frequency dependent, varying widely over the audio-frequency range. Moreover, the coil of an autotransformer typically is designed to have a very high unloaded ("magnetizing") impedance; when a source and load are connected, the source sees an effective input impedance that is the load impedance multiplied by an impedance ratio (the square of the turns ratio) and the load sees an effective source impedance that is the actual source impedance divided by the same impedance ratio (approximately, based on the "ideal transformer" model, which is a good approximation for well-designed practical iron-core transformers). Since Applicant has not specified to which of these three (or possibly another) coil impedances the limitation refers, a specific speaker whose impedance is referenced, nor at what frequency or range of frequencies the recited impedances are determined, one of ordinary skill in the art could not reasonably ascertain the metes and bounds of the invention claimed. Consequently one could not determine whether a given apparatus (which, like that claimed, does not include a speaker) infringes on the claimed invention.

12. **Claim 22** recites, "the inductance of the coil is greater than the inductance of the speaker", and **claim 23** recites, "The power attenuation circuit of claim 22 wherein the inductance of the coil is about fifty times greater than inductance of the speaker." Since the invention does not properly claim a speaker (except to state that it is intended for use with a speaker) and various different types of speakers were widely known and used (dynamic, electrostatic, piezoelectric, etc.) at the time the present invention was

made, with significant variation of inductance possible among each general type, the limitation "fifty times greater than the inductance of the speaker" is indefinite because one of ordinary skill in the art could not reasonably ascertain what is the inductance of an unspecified speaker that is not part of the invention, and thus, the metes and bounds of the invention claimed. Consequently one could not determine whether a given apparatus (which, like that claimed, does not include a speaker) infringes on the claimed invention. Because **claim 24** inherits these limitations from claims 22 and 23, it is rejected on the same grounds.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. **Claims 20, 21, and 25** are rejected under 35 U.S.C. 102(b) as being anticipated by Stefani et al. (US 3,160,841).

15. Regarding **claim 20**, Stefani et al. disclose in Fig. 1 a power attenuation circuit suitable for use with a musical amplifier and a speaker, comprising:

a variable autotransformer (10) having:

a coil (13) with a first coil terminal and a second coil terminal (inherently, at the ends of the toroidal winding [coil] 13, where leads 16 and 17 connect to the ends of the winding [coil] as described at column 3, lines 8-10); and

a variable coil tap having a first contact (15) in moveable electrical communication with the coil at a contact point (column 3, lines 5-8) and an output node (comprising 15, 19, 30, 31, 35), wherein the first contact (15) defines a first coil partition between the contact point and the first terminal and a second coil partition between the contact point and the second terminal (inherently);

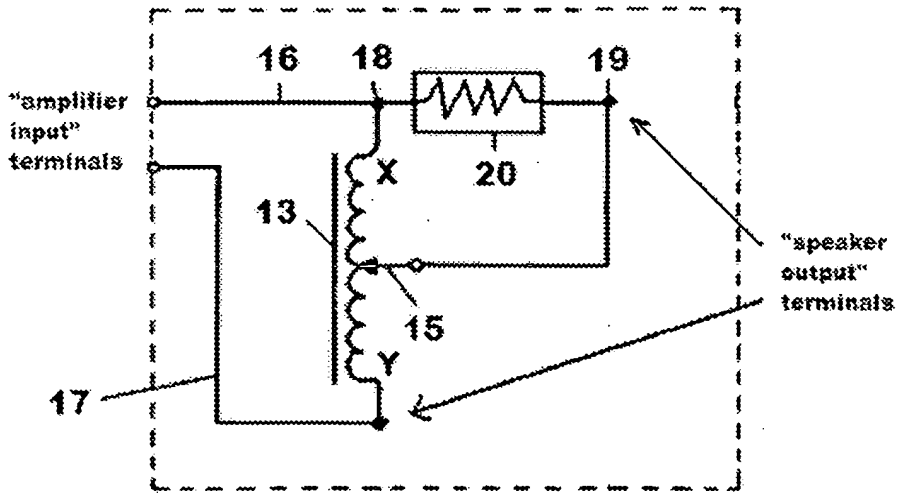
a first "amplifier input" terminal (the end of lead 16, where it connects to a source of alternating current, as described at column 3, lines 8-10) in electrical communication with the first coil terminal (column 3, lines 8-10);

a second "amplifier input" terminal (the end of lead 17, where it connects to a source of alternating current, as described at column 3, lines 8-10) in electrical communication with the second coil terminal (column 3, lines 8-10);

a fixed resistor (20) in parallel electrical communication with the first coil partition (by means of the internal portion of lead 16, not illustrated); and

"speaker output" terminals (19 and an end of lead 17) in parallel electrical communication with the second coil partition and in series electrical communication with the fixed resistor (20).

Although Stefani et al. do not provide a complete electrical circuit diagram corresponding to Fig. 1, the description at column 2, line 69 –column 3, line 16 provides sufficient detail to deduce what is not explicitly shown in Fig. 1. An electrical circuit diagram showing the power attenuator circuit of Fig. 1 of Stefani et al. as described in the specification, based on Applicant's Fig. 2 is shown below to illustrate the correspondence to the limitations of claim 20.



The recitation, "for use with a musical amplifier and a speaker", in the preamble of the claim is merely a statement of the intended use of the apparatus and does not patentably distinguish it from the prior art having the same structure (see MPEP 2111.02). Also, the recitation of "a first amplifier input terminal", "a second amplifier input terminal", and "speaker output terminals" in the body of the claim merely serves to name the terminals, or at best, to state an intended use for the terminals, neither of which patentably distinguishes the recited apparatus from the prior art having the same structure. The inherent terminals at the non-illustrated external ends of leads 16 and 17 of the apparatus of Fig. 1 of Stefani et al. are suitable for use as an input connection from an amplifier (a "source of alternating current", as recited at column 3, lines 8-10), and thus can be described as "amplifier input terminals"; similarly, the terminals at either

end of lead 17 and terminal 19 of Fig. 1 are suitable for use as output connections for a speaker, and therefore can be described as "speaker output terminals".

16. Regarding **claim 21**, a fixed resistor, such as 20 of Fig. 1 of Stefani et al., any functional speaker, and the coil 13 of the autotransformer of Stefani et al. inherently each have an impedance; because practical autotransformers, such as that disclosed by Stefani et al. exhibit losses (i.e., they have efficiencies less than 100%), the input impedance at leads 16 and 17 would inherently be less than the sum of the impedance of fixed resistor 20 and a hypothetical speaker or other load connected to the "speaker output" terminals described above with regard to claim 20; thus, the sum of the impedance of the fixed resistor (20) and the impedance of the hypothetical speaker would be greater than the impedance of the coil.

17. Regarding **claim 25**, any thermally-conductive material or body that is affixed to a resistor will conduct heat therefrom, and thus act as a heat sink. In the apparatus of Fig. 1 of Stefani et al., the connecting leads of resistor 20 and elements to which they are connected, such as terminals 18 and 19 constitute a heat sink affixed to the resistor, as broadly as claimed.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. **Claims 22-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stefani et al. (US 3,160,841).

20. Regarding **claim 22**, as indicated above under 35 USC §102 rejections, Stefani et al. disclose a power attenuation circuit meeting the limitations of claim 20. Any speaker inherently has an inductance, as does the coil 13 of the autotransformer of Fig. 1 of Stefani et al. Official notice is taken that it was notoriously well known in the art at the time the present invention was made to design autotransformers, such as that disclosed by Stefani et al., to have a high inductance in order to provide a high magnetizing impedance (much higher than the anticipated reflected load impedance) and consequently a low level of power loss under no-load conditions. Thus, for an autotransformer that is intended to drive a loudspeaker, at the time the present invention was made, it would have been obvious to one of ordinary skill in the art to provide an autotransformer with an inductance that is greater than the inductance of the

speaker in order to minimize the power loss due to the self inductance of the autotransformer coil, according to this common practice in the art.

21. Regarding **claims 23 and 24**, Stefani et al. do not disclose the specific impedance of the coil of the autotransformer. Applicant has not shown any particular reason for employing a variable autotransformer in which the coil has an inductance of specifically "about fifty times greater than inductance of the speaker" or "about fifty-three milliHenries", except to imply by "The inductive element of the present invention is a circular continuous tapped transformer coil (variac) as it can be found in voltage-adjustable power supplies" at page 10, lines 10-16 of the specification that the autotransformer of the invention is a conventional type. At the time the present invention was made, it would have been obvious to one of ordinary skill in the art to employ a coil of a conventional and widely-available type, such as those found in common voltage-adjustable power supplies, having a self inductance that will produce a magnetizing impedance over the expected frequency range of operation that is significantly greater than the anticipated reflected load impedance, as described above in regard to claim 22, in the autotransformer of Stefani et al.

22. **Claims 26 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Scholz (US 4,363,934) in view of Lowell (US 5,054,076), Scholz (US 4,143,245), Müller (US 2,157,557), Doran (US 1,883,624), and Painter (US 1,887,065).

23. Regarding **claim 26**, Scholz ('934) discloses in Fig. 1 a musical instrument amplifier comprising:

a power amplifier section (10) having an output;

a variable [voltage divider] (R0, R1, R2, and 20) in communication with the output of the power amplifier, the variable [voltage divider] further comprising a [voltage-divider impedance] (R0, R1, and R2) with a first [voltage-divider impedance] terminal (at the top of R1) and a second [voltage-divider impedance] terminal (at the bottom of R2) and a variable [voltage-divider impedance] tap (20) having a first contact (20A) in moveable electrical communication with the [voltage-divider impedance] at a contact point (20B) and an output node (as illustrated);

wherein the first contact (20A) defines a first [voltage-divider impedance] partition (R1 and the portion of R0 above the particular tap with which 20A is in contact) between the contact point and the first terminal and a second [voltage-divider impedance] partition (R2 and the portion of R0 below the particular tap with which 20A is in contact) between the contact point and the second terminal;

a fixed resistor (RB) in parallel electrical communication with the first [voltage-divider impedance] partition; and

a speaker (as illustrated, comprising RS) in parallel electrical communication with the second [voltage-divider impedance] partition and in series electrical communication with the fixed resistor (RB).

Scholz ('934) does not disclose that the variable voltage divider is a variable autotransformer, nor that the voltage divider impedance is a coil; rather, Scholz ('934)

describes and claims the voltage divider impedance generally as an "impedance" (e.g., at column 2, lines 19-33 and claim 1), and in specific instances as a resistor or combination of resistors (e.g., at column 2, lines 33-59 and claims 2-4).

At the time the present invention was made, variable autotransformers (either discretely-tapped or continuously-variable) were widely known in the electrical and audio arts as an equivalent to resistive voltage dividers (either discretely-tapped or continuously-variable "potentiometers") for the purpose of reducing the amplitude of an AC voltage signal in general, and also specifically for adjusting the voltage of a signal delivered to a loudspeaker following power amplification of the signal (at least discretely-tapped autotransformers). Tapped autotransformers, such as those of Lowell and Farinelli, were widely used for controlling speaker volume, as were resistive types (typically wire-wound potentiometers), such as those of Scholz ('245), Müller, and Doran.

Similarly to Scholz ('934), Painter discloses an attenuator in which the voltage divider elements are described as "resistance or impedance elements" (e.g., at column 2, lines 79-80) or simply "impedance elements" (e.g., claim 1), thus demonstrating that variably-tapped impedance elements other than resistances can be equivalently employed. Generally, there are three basic types of impedance elements, resistances, inductances, and capacitances (or combinations thereof). Since practical continuously-tapped variable capacitors for use at audio frequencies with loudspeaker-impedance-level signals were not known in the art at the time of the invention of Painter, one of

ordinary skill in the art would infer that "impedance element" refers alternatively to a primarily-resistive element (resistor) or a primarily-inductive element (inductor or coil).

Also, the prior art shows that it was widely known to attempt to provide a constant load impedance to an audio amplifier to which a loudspeaker is connected via an attenuation circuit, particularly with vacuum-tube amplifiers, as it was well known in the art that they are subject to damage when operated without a proper load impedance connected; this is demonstrated by the general disclosures of Scholz ('245 patent at column 2, lines 25-49 and '934 patent at column 1, lines 48-55), Müller (column 1, lines 17-48), and Doran (column 1, lines 27-33).

Scholz ('934) discloses at column 1, lines 35-47 that a problem with prior-art resistive volume control circuits is that at a maximum volume position, there is still a power loss due to the resistive voltage divider being coupled in parallel with the speaker, and as a solution, discloses in Fig. 2 and at column 3, line 57 –column 4, line 36, a bypass switch (S1) that, in a "MAX" position, bypasses the resistive voltage divider to direct maximum power to the loudspeaker. Switch "S" in Fig. 1 of Müller serves an equivalent function. At the time the present invention was made, it was well known in the electrical arts that transformers (including autotransformers) are capable of producing a reduced-voltage output signal from a given AC input signal without the power loss that would occur in a resistive voltage divider.

Lowell discloses in Fig. 2, a similar loudspeaker volume control, without the first impedance means (RB) of Scholz ('934) and employing a variably tapped autotransformer as the voltage divider. Such autotransformer loudspeaker volume

control circuits were well known and widely used at the time the present invention was made (e.g., Farinelli). At the time the present invention was made, one of ordinary skill in the art would have recognized that, unmodified, the variable autotransformer attenuator of Lowell by itself would not provide a proper load impedance for a vacuum-tube amplifier; it would appear essentially as an open circuit to an amplifier output circuit under such a condition. Scholz ('934) discloses at column 3, lines 48-50 that the primary purpose of resistor (RB) is to maintain the input impedance at a relatively constant value as the attenuation factor is varied. At the time the present invention was made, one of ordinary skill in the art would have recognized that with an autotransformer voltage divider, such as that disclosed by Lowell, substituted for the resistive voltage divider of Scholz ('934), resistor RB would perform the same function (i.e., to maintain a constant input impedance to the circuit).

It would have been obvious to one of ordinary skill in the art at the time the present invention was made to substitute an autotransformer, such as disclosed by Lowell, for the resistive voltage divider of Scholz ('934) in order to provide a volume control that operates efficiently when the output level is set to a maximum level without requiring a separate bypass switch, while maintaining a relatively-constant load impedance as the degree of attenuation is varied.

24. Regarding **claim 27**, in the power attenuation circuit of Scholz ('934), modified according to the teachings of Lowell, Scholz ('245), Müller, Doran, and Painter as described above regarding claim 26, fixed resistor RB, the speaker, and the coil of the

autotransformer inherently each have an impedance; because practical autotransformers all exhibit losses (i.e., they have efficiencies less than 100%), the input impedance of the autotransformer coil with the load (RB and the speaker) connected would inherently be less than the sum of the impedance of the fixed resistor (RB) and the impedance of the speaker alone; thus, the sum of the impedance of the fixed resistor (RB) and the impedance of the speaker would be greater than the impedance of the coil.

25. Regarding **claim 28**, in the power attenuation circuit of Scholz ('934), modified according to the teachings of Lowell, Scholz ('245), Müller, Doran, and Painter as described above regarding claim 26, fixed resistor RB, the speaker inherently has an inductance, as does the coil of the autotransformer. Official notice is taken that it was notoriously well known in the art at the time the present invention was made to design autotransformers, such as that disclosed by Lowell, to have a high inductance in order to provide a high magnetizing impedance (much higher than the anticipated reflected load impedance) and consequently a low level of power loss under no-load conditions. Thus, at the time the present invention was made, it would have been obvious to one of ordinary skill in the art to provide an autotransformer with an inductance that is greater than the inductance of the speaker in order to minimize the power loss due to the self inductance of the autotransformer coil, according to this common practice in the art.

26. Regarding **claims 29 and 30**, Lowell does not disclose the specific impedance of the coil of the autotransformer. Generally, transformers are specified according to a turns ratio, maximum voltages, and maximum currents (while often the maximum voltage rating and turns ratio are expressed in combination in the form of a design input voltage and output voltage). Applicant has not shown any particular reason for employing a variable autotransformer in which the coil has an inductance of specifically "about fifty times greater than inductance of the speaker" or "about fifty-three milliHenries", except to imply by "The inductive element of the present invention is a circular continuous tapped transformer coil (variac) as it can be found in voltage-adjustable power supplies" at page 10, lines 10-16 of the specification that the autotransformer of the invention is a conventional type. At the time the present invention was made, it would have been obvious to one of ordinary skill in the art to employ a coil of a conventional and widely-available type, such as those found in common voltage-adjustable power supplies, having a self inductance that will produce a magnetizing impedance over the expected frequency range of operation that is significantly greater than the anticipated reflected load impedance, as described above in regard to claim 28.

27. Regarding **claim 31**, at the time the present invention was made, one of ordinary skill in the art would have recognized that at high levels of input power and high attenuation factors, the first impedance means (RB) in the volume control circuit of Scholz ('934), modified according to the teachings of Lowell, Scholz ('245), Müller,

Doran, and Painter as described above regarding claim 26, would be required to dissipate a high level of power. Official notice is taken that at the time the present invention was made, it was well known in the electronics arts to provide fixed resistors that are expected to dissipate high levels of power with heat sinks to extract and convey heat from the resistor device to prevent the resistor from being damaged by excessive temperatures. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to affix a heat sink to fixed resistor (RB) to prevent damage due to overheating of the resistor.

Response to Arguments

28. Regarding Applicant's comments with respect to priority, the examiner acknowledges that the limitations previously noted as not being supported in the priority document (provisional application) are not present in the current claims; however, as noted above under 35 USC § 112, first paragraph rejections, some of the new claims are of a scope that is not supported by either the provisional application or the current disclosure, as originally filed.

29. The examiner acknowledges that the claims and limitations that were previously rejected under 35 USC § 112 have been cancelled, and thus, the rejections are moot; therefore those rejections are withdrawn, however, new rejections under this section are detailed above.

30. Applicant's arguments filed 21 January 2005 have been fully considered but they are not persuasive.

31. Regarding Applicant's assertion that the invention answers a long-felt, but unsolved need, where others have failed to provide a satisfactory post-power amp volume attenuation means, the examiner notes that a wide variety of satisfactory such attenuators are known and used; this is evidenced by the "Guitar Amp Power Attenuator FAQ" (Reference V of the Notice of References Cited, Form PTO-892 of the Office action mailed 11 December 2003), which lists a number of popular attenuators, including the Altair PW-5, Scholz Power Soak (apparently according to Scholz '934, as applied in the rejections above), THD Hot Plate, Marshall Power Brake (which, incidentally employs a tapped autotransformer and a resistor to absorb excess power, although not quite as in Applicant's invention), Kendrick Power Glide, Trainwreck Air Brake, Koch LB-120. Although different musicians or other experts may express a preference for a particular attenuator, while expressing a dislike for or alleging a fault in another, audio perception is a highly subjective subject, and what sounds good to one

person may not sound good to another. Although Applicant suggests that the present invention is the ultimate solution to the problem of guitar amplifier loudspeaker attenuation, there would almost certainly be some who prefer the sound of another existing design over that of Applicant, or find some other alleged fault in the attenuator disclosed by Applicant. It is also noted that the Guitar Amp Power Attenuator FAQ also cites (at page 7) the "Enforcer attenuator for ham radio" (Reference W in the attached PTO-892 Notice of References Cited), which (the model EA10) is a variable autotransformer loudspeaker attenuator, of the basic type disclosed by Lowell, applied in the prior-art rejections above. Thus, an implicit suggestion is made to employ a variable autotransformer as (or in) a guitar amplifier loudspeaker attenuator.

32. Regarding Applicant's discussion at pages 14-19 of the obviousness of combining the references (particularly Scholz '934 and Lowell) and the alleged teaching away from combining these references with regard to paragraphs 20-26 of the previous Office action, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, while Applicant states that "The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination", and "it is not

necessary for the references to teach away from the combination – it is enough that there be no suggestion in the references that they be combined", as stated above, the desirability of making a combination (motivation to combine) need not come from the references themselves, but can come from the knowledge generally available to one of ordinary skill in the art. The examiner in the portion of the prior Office action quoted at page 14 of Applicant's current reply was responding to Applicant's allegation that the references teach away from the combination; the examiner described elsewhere motivation for combining the references, and was not attempting to state that the absence of a teaching away from combing the references constituted a motivation to combine. As stated in the prior-art rejections above, much of the motivation to combine Scholz ('934) and Lowell comes from common knowledge in the art. Scholz ('934) discloses at column 1, lines 35-47 that a problem with prior-art resistive volume control circuits is that at a maximum volume position, there is still a power loss due to the resistive voltage divider being coupled in parallel with the speaker. Autotransformers are an art-recognized equivalent for performing voltage division of AC signals, and are capable of doing so without the power loss that would occur in a resistive voltage divider (although they typically have certain disadvantages, for example, greater distortion). This art-recognized equivalence is demonstrated by the Guitar Amp Attenuator FAQ, referred to above (e.g., at page 2, lines 19-24) and Six (US 1,990,099). Common knowledge in the art also provides the teaching that vacuum-tube amplifiers should be presented with a load impedance that is maintained near a specific design value during operation to prevent damage to the output circuitry thereof, as well as the teaching that

an autotransformer (or a conventional transformer) operating at a high turns ratio will present a much higher input impedance at the primary winding or tap than the actual impedance of the load connected to the secondary winding or tap (by a factor of n^2, where n is the primary-to-secondary turns ratio). Thus, one of ordinary skill in the art would recognize that supplemental impedance means would be required to maintain a reasonably constant input impedance in an autotransformer-based attenuator as the degree of attenuation is varied, if used in conjunction with a vacuum-tube amplifier (as in the Marshall Power Brake circuit [Reference V]). Lowell is not relied upon for any profound teaching with regard to Applicant's invention, other than to demonstrate the common use of autotransformers in loudspeaker attenuation circuits. Common knowledge in the art, including the art-recognized equivalence of autotransformers and resistive voltage dividers for reducing the level of audio signals, along with the teaching of Scholz ('934) at column 3, lines 48-50 that the primary purpose of resistor (RB) is to maintain the input impedance at a relatively constant value as the attenuation factor is varied provides a reasonable expectation of success from the combination of Scholz ('934) and Lowell.

33. In response to applicant's argument that one of ordinary skill in the art would not consider the autotransformer of Gonzalez to be a desirable element of a volume control system that attempts to achieve the objectives of the present invention because Gonzalez is directed to a device for producing different sounds, while the present invention seeks to preserve the sound of the instrument while varying the volume

thereof, an apparatus is defined by what it is, not by the intended purpose for which it was created. Where the prior art leads to an obvious invention that is structurally the same as claimed by Applicant, that invention renders Applicant's apparatus claim obvious. In other words, the prior art need not show the same reason as Applicant for arriving at the claimed invention. Moreover, because Gonzalez is not relied upon in the prior-art rejections of the present claims, above, the point is relatively moot.

34. In response to Applicants' arguments, beginning at page 16 of the current remarks, that that (in essence) Lowell is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Lowell certainly is analogous art, as evidenced by its classification in the US Patent classification system, class 381 (Electrical Audio Signal Processing Systems and Devices), subclass 109 (including amplitude or volume control, with manual volume control), which is the same classification as Scholz ('245 and '934), Müller, and Six. This is a relatively narrow subclass, currently serving as a primary classification for only 60 patents and patent application publications. (The instant invention is currently tentatively classified in class 381, subclass 104 [Electrical Audio Signal Processing Systems and Devices, including amplitude or volume control], under which subclass 109 is indented.) Contrary to Applicant's assertions, Lowell is relevant to musical

amplification. It is well known to play music over distributed sound systems of the type suggested by Lowell; in doing so, the autotransformer is expected to reproduce musical sounds, including sounds of overdriven guitar amplifiers, at a reduced level without significantly altering the character of the sound. In seeking alternative solutions to the problem of power loss in resistive voltage divider attenuators at a maximum volume setting, as disclosed by Scholz, one of ordinary skill in the art would likely search the patents that are classified therewith.

35. In response to Applicant's argument that autotransformers and resistive voltage dividers are not shown to be art-recognized equivalents, this issue is partially addressed above with regard to the obviousness of combining the teachings of Scholz and Lowell. Further, Curtis et al. (US 6,389,139) shows recognition of such equivalence at column 2, lines 22-67. While Applicant is correct in stating that "Resistors and inductors (such as the coil of a variable autotransformer), while both having impedance, are not always interchangeable in a circuit", the prior art shows that in simple attenuation circuits, there is a basic equivalence between autotransformers and resistive voltage dividers with respect to AC signals within a specific frequency range, such that they are essentially interchangeable (although each may have certain advantages and disadvantages relative to the other) in simple audio power attenuation circuits.

36. In response to Applicant's argument that "Scholz teaches that substantially continuous controller – specifically potentiometers – are undesirable, due to non-uniform and unreliable performance", and thus teaches away from the use of a variable autotransformer, although Scholz does disclose certain disadvantages of **resistive potentiometers,** he makes no statement about variable autotransformers; also, such a identification of "disadvantages" of a prior-art apparatus is not a teaching away from employing such an apparatus. Scholz discloses at column 1, lines 16-18 that the apparatus of Scholz ('245), which employs a continuously-variable resistive voltage divider, **has worked satisfactorily**, but has certain disadvantages associated therewith. A teaching away from a particular apparatus or combination of teachings essentailly requires the reference to state that such an apparatus or combination of teachings would not work to achieve a desired result to any reasonable degree; a mere disclosure of a better arrangement does not constitute a teaching away from a slightly-less desirable arrangement. Finally, it is noted that the present claims do not specify a continuous controller, just a "variable autotransformer" with "... a variable coil tap having a first contact in moveable electrical communication with the coil at a contact point ...", which reads on the discretely-variable autotransformer of Lowell.

37. Regarding Applicant's argument that Scholz teaches away from the present invention because his invention is directed to providing a compact system, and variable transformers are quite large, this is obviously a secondary objective of the invention,

and ignoring that particular objective would not render the invention unsuitable for its primary intended purpose (attenuating a loudspeaker signal). Further, Applicant's own disclosure, at page 5, lines 5-7 and page 7, line 24 –page 8, line 2 of the specification seems to contradict such an assertion, stating that the resistive ladder network voltage divider circuit of Scholz proved to be too large to be built into a conventional amplifier chassis, while the variable autotransformer circuit of the present invention (using a conventional variac) could be.

Conclusion

38. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

39. Dull (US 2,030,573) discloses a loudspeaker attenuation circuit in which a signal is applied in varying proportions to opposing voice coils of a single speaker to attenuate the sound produced. The disclosure also demonstrates equivalence between resistive attenuators and variably-tapped transformers.

40. Rice (US 4,405,894) discloses a continuously-variable voltage divider based on a variac for balancing (or intentionally unbalancing) power between a pair of loads.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony M. Jacobson whose telephone number is 571-272-7521. The examiner can normally be reached on M-F 11:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh N. Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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May 28, 2005

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